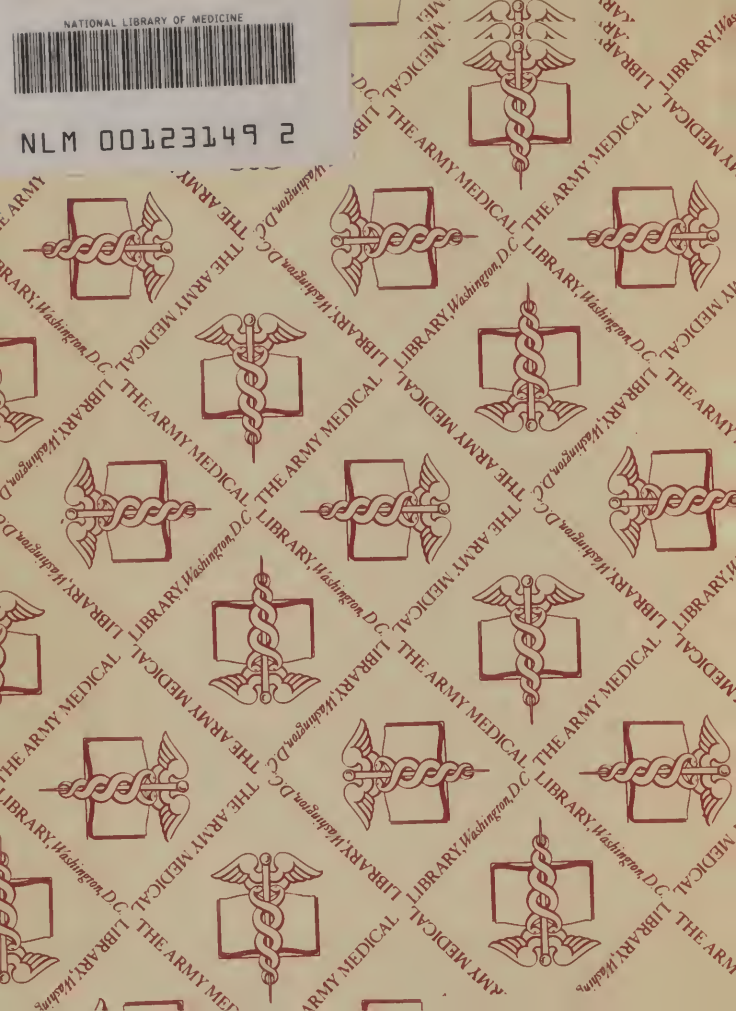






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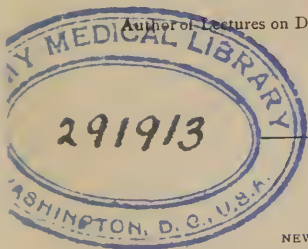
AND

HOW TO TAKE CARE OF IT.

BY

EDWIN M. HALE, M. D.,

Author of Lectures on Diseases of the Heart, etc., etc.



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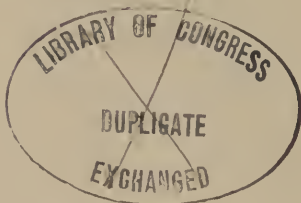
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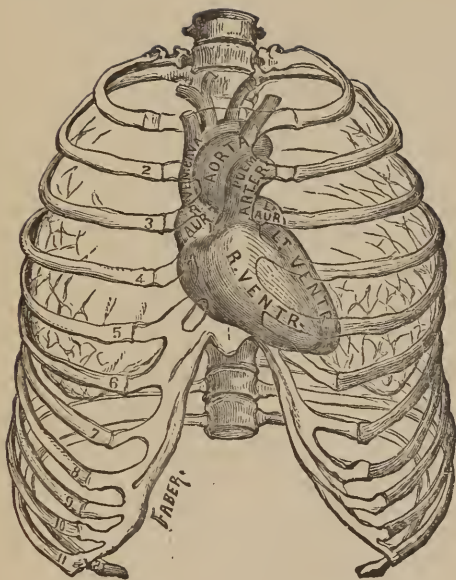
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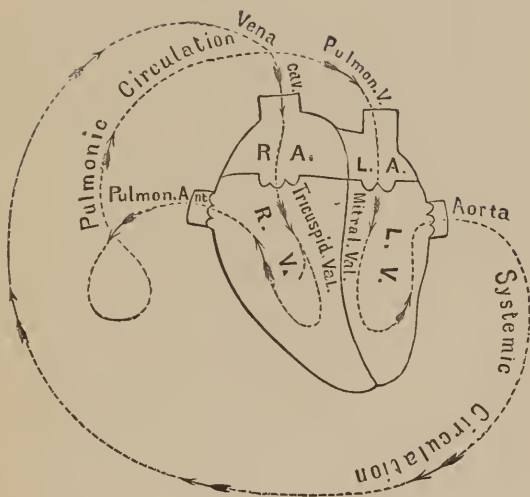
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LOCATION OF THE HEART.







CIRCULATION OF THE BLOOD.





*THE HEART AND HOW TO TAKE  
CARE OF IT.*

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BY EDWIN M. HALE, M. D.

(Author of "Lectures on Diseases of the Heart." etc.)

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IN the selection of this subject as the theme of a popular treatise I am prompted by two impulses—(1) The importance of the Heart in the economy of the human organism, and (2) a belief that the public should know more about its functions, and the means of preventing, or at least modifying, the dangers to which it is exposed.

The first inquiry which will meet us at the threshold, will be

WHAT IS THE HEART?

To which I answer: It is the centre of the blood system, just as the spinal cord is the centre of the spinal system, and the brain is the centre of the mental forces. As the brain animates the body with intention and purpose, the heart, as the blood's executive power, gives corporeal substance to the frame, for the body is nothing more than solidified reorganized blood, and the blood is, in reality, only the fluid body.

The spinal cord sends the various kinds of nerves—the motor, sensory and nutritive—to all portions of the body, to give it motion and life, so the heart sends through the arteries to every portion of the system the blood which feeds it and gives it growth.

Anatomically the heart is a conical, hollow, muscular organ, lying obliquely in the chest, between the two lungs, the larger end, or base, pointing upward in the direction of the right shoulder, the small end, or apex, pointing to the left side, just above and to the left of the stomach.

It is encased in a peculiar bag, or capsule, called the pericardium, in which it swings its constant round until arrested by the hand of death. The space between the heart and its case contains more or less fluid whereby the heart is lubricated, and its motions rendered smooth and easy.

The heart comprises four cavities or chambers—two *auricles*, occupying the upper portion or base, and two *ventricles*, which occupy the lower portion. Each side of the heart has one auricle and one ventricle. The *right* pair of cavities are devoted to the circulation of *venous* blood, the left pair to that of *arterial*.

In its primitive form, as when found in the lowest forms of animal life, the heart is merely a pulsating sac. In its gradual evolution up the scale of creation it becomes more and more complicated, until in man it is composed of four chambers, and has its force economized and directed by numerous valves which prevent misdirection and regurgitation of the vital fluid.

The muscular structure of the heart in the higher animals is wonderfully complicated and complete, and answers beautifully the purpose for which it was intended.

The heart consists of seven layers of muscular fibres; the central fibres of the muscular wall are circular, and go *around* the heart, while the fibres towards both outer and inner surfaces pass rather from base to apex, *twisting spirally* in their course. The outer and inner fibres continue into or connect with each other. Thus the heart may be described as a *coiled* spring of muscular fibre. Some of the great anatomists of the time have unwound these fibres, and they are found to be very complex in their connections, but all, except the central fibres, pass obliquely around the heart, and nearly represent the figure 8, only not as simple.

The *nervous* supply of the heart is even more wonderful than its muscular structure. It is so exquisitely elaborate that I could not explain it to you so that you could understand it.

Suffice it to say that the nervous life of the heart itself is stored up in minute ganglia found in the substance of its muscular walls. The heart may thus be said to have a life of its own, and the fact that the heart will go on beating after it is taken out of the body illustrates this fact. In some of the lower animals, the reptiles, the

heart will throb and beat for hours after it is separated from the body.

Not only will the *whole* heart continue to beat when removed from the body, but even small and isolated portions will contract and relax with great regularity. Cut the heart lengthwise into two halves, and each half will continue beating. Cut it across through both auricles and ventricles, and both sections will beat as before. Take out ever so small a piece of the heart, and if it contains one of the little nervous knots called ganglia, it will beat as if it was the whole heart itself.

Besides the general nervous life which the heart receives through the *great sympathetic* from the brain and spinal cord, it is governed by three wonderful sets of nerves, which are called as follows: (1) The *accelerators*, which have power to increase and keep up the action of the heart; (2) the *retardators*, which have an influence to slow its action; and (3) the *regulators*, or inhibitory nerves, which keep the pulsations in order and govern its rythmical motions.

If it were possible to expose these nerves in a living person, as has been done in animals, we could illustrate their influence; thus, if we were

to cut the *accelerators*, the heart would be under the opposing nerves, the *retardators*, and consequently its beats would become very slow and sluggish. On the contrary, should we sever the retardators, the heart, left to the influence of the *accelerators* and its own nervous life, would beat more and more rapidly, like a watch when its main-spring is broken.

But should we sever the *regulators*, we would find the regular *rythm* of the heart, and possibly its regular *force*, so modified that it would intermit in its action, or "wobble" in its motion unless regulated by its own internal ganglia.

#### THE CIRCULATION OF THE HEART.

Like the ring, the symbol for eternity, the circulation of the blood by the heart can be said to have neither beginning or end. We may begin the circle where we please, and we shall find that it returns into itself.

Starting, for instance, from the *left ventricle*, we see that the blood is driven, by the contraction of that cavity, into the great aorta, the highway which leads into all the arteries of the body. Through these, after they have ramified into the extreme portions of the system, the blood



is discharged into the veins, which unite to form two great trunks—the *vena cavæ* which are again the thresholds of the heart, and empty into the *right auricle*. The blood which has now passed from the left ventricle into the right auricle has still a journey to make before it completes its course. Accordingly, from the right auricle it is forced into the right ventricle, and by the ventricle into the pulmonary artery, which conveys it to the lungs, where it is purified and brought back by the pulmonary veins, which empty into the heart's left auricle, and thence thrown into the left ventricle, the place from which we started.

#### DOES THE HEART EVER REST?

It was until late the professional, and is still the popular belief, that the heart never rests. But it is now known that the heart not only rests, but sleeps. It is true that in its incessant round of labor no long repose is compatible with the continuance of the existence of the organism. The heart not only rests and sleeps, but the amount of sleep is not small. It is estimated by Marey, the great French investigator, that *four-fifths* of the heart's life is devoted to rest, sleep and feeding. The heart, then, sleeps no less

than 19 out of 24 hours. It is not meant, however, that this period is one of absolute inactivity, or of immobility.

Any increase in the rapidity of the pulse (the heart's beating) tends to exhaust the heart by diminishing not only its sleep, but equally its time for nutrition. The important bearings of this fact will be explained further on.

#### THE PHYSICAL POWER OF THE HEART.

A wonderful thing about the heart is its immense physical power. Every time it pumps blood into the arteries it exerts a force estimated at thirteen pounds. The usual force constantly exerted by the healthy human heart would sustain a column of blood  $7\frac{1}{2}$  feet high, the weight of which would be about 4lb. 6oz. Imagine if you can an organ exerting this immense force hour after hour, day after day, year after year, and then try to estimate the aggregate power of the heart during the life of a man!

It must be considered also that the average physical power may be greatly increased by various causes. Unusual exertion, like lifting, running, climbing, may increase, temporarily, the amount of propelling force exerted by the heart,

hence we may get from over-exertion, apoplexy, bleeding from the lungs, and other hemorrhages, because of the unusual force with which the blood is propelled into the blood-vessels, causing them to burst.

In violent, inflammatory fever, the blood pressure may be so increased that the pulse throbs under the finger like the vibrations of an iron wire, and such severe congestions occur as often threaten or destroy life.

Certain poisonous drugs possess the power of increasing enormously the propelling power of the heart, either directly or indirectly. In taking care of the heart these facts ought to be remembered in order that we may avoid those causes which tend to excite the heart to unnatural action.

I can imagine that right at this point the following question arises—

HOW SHALL WE KNOW WHEN THE HEART IS  
HEALTHY?

The broad, general answer to this question would be, "*When you are not conscious that you have a heart!*" It is an axiom in pathology that so soon as you are *conscious* of the existence

of any internal organ, it is diseased. Now this is very nearly true, so true that it may be made a rule of guidance in many cases.

There are other signs by which you may know that you have a healthy heart. The *pulse* is a pretty good guide. If the pulse of an average healthy adult ranges between 70 and 80 beats per minute, and is full and regular, it indicates that the heart is not much disordered. The pulse rate varies with the age. In a child at birth it numbers 120 or more. The average pulse in the first year of life is 104; from 2 to 5 years, 95; between the ages of 6 and nine it is 80; after this age 72 to 76, the same as the natural pulse of adults. The pulse of girls and women exceeds in number that of boys and men by as many as five beats per minute.

As a rule any great variation in regularity, any intermittency, indicates some derangement of the heart. While variations from a healthy standard in rate and size indicate general or local derangement not necessarily of the heart.

*Sensations* in the heart, such as throbbing, fluttering, soreness, pains of any kind, indicate that all is not right in that organ. But I must warn you that such is the general lack of knowl-

edge relative to the *location* of the heart, that pains and other sensations usually referred to the heart are not in that organ. By referring to the frontispiece you will see where the heart lies. Now the popular impression is that the heart lies much lower and to the left.

It is a laughable fact that actors and actresses on the stage, when they refer to the heart, oftener place their hand on the pit of the stomach than over the organ which they are in the act of apostrophizing.

It will be almost impossible for you to locate with any certainty abnormal pains and sensations in the heart, but you can more accurately judge from its *action*, for in palpitation, irregular action, and intermittency the sensation is very generally in the heart itself. It often requires the most careful investigation of the physician to decide whether certain pains are in the heart, or in the muscles which envelop the chest.

In a state of health—*i. e.*, with a healthy heart, no change of position, or ordinary exertion, causes any unnatural action of, or pains in the heart. Therefore—if lying on the side, especially the *left*—causes any unpleasant sensations or actions of the heart, it is an indication of some derange-

ment of it. If stooping, lifting, going up stairs, walking fast or running, makes you acutely conscious that you have a heart, there is something wrong. I would not have you mistake this kind of action for the healthy, strong, rapid beating which comes after unusual exertions. The latter soon subsides, leaving you as unconscious of the heart's existence as you were before, while the former, by its constant recurrence, keeps you reminded of its presence, and that it is a source of annoyance. Nor should you get the idea fixed in your mind that because your heart acts unnaturally and is the seat of unpleasant sensations, that you have heart-disease. Only a small proportion of those who complain of their hearts have any disorder of that organ from disease originating in it. A vast majority of heart derangements are caused by derangements of other organs. You ask why this can be. It is commonly called irritation from sympathy, which means that a disordered liver or stomach may cause more or less deranged action in the heart, because the irritation of those organs is reflected back to the great chain of nerves called the sympathetic or reflex nervous system, and carried by them to the heart. This kind of irritation is

known to physicians as "reflex irritation," and may proceed from, or originate in, organs very remote from the heart.

Nevertheless, you should heed these reflex irritations, for they warn you that the health of other organs is impaired, and should be attended to, for even if the cardiac irritation is purely reflex, if it continues a long time it will result in a disorder of the heart itself, and remain fixed there.

The next question which you are inclined to ask is—

#### HOW CAN WE TAKE CARE OF THE HEART.

To which I answer, *by avoiding all those influences which tend to derange its action, or cause disease to fix itself thereupon.* And right here I must warn you against going to the extreme of solicitude, and even on the other side. *It is neither prudent nor safe to watch the heart with too much solicitude.* I have known many cases of supposed heart disorder to be caused by watching the heart's action and the pulse, or rather from watching *for* evidences of heart disorder, when none existed.

Many persons become monomaniacs on this subject, and annoy their medical attendants very much by insisting that they have some affection of the heart, and doubt persistently the assertions of the physician after careful examinations that no actual disorder of the heart exists.

Sometimes it is utterly useless for us to assure and reassure such patients that the heart is not diseased. The best method I have ever adopted in such cases is to direct their attention to other organs as the source of complaint.

#### CAN WE INFLUENCE THE HEART THROUGH THE WILL? OR THE IMAGINATION?

Although the heart is made of involuntary muscular fibres, which are supposed to act independently of the will, it receives its supply of nerve-force from nerves which originate in the brain. We know, too, that mental emotions directly affect the heart, which they must do through these nerves. Why should not the brain, acting to enforce *will*, send its mandates to the heart? Some remarkable cases are on record which show that such may be the case. Physicians know that the action of the heart may be quickened by the mere centering of the con-



sciousness upon it, without any emotion or anxiety. We all observe that when we begin to feel the pulse, it is always hurried if the patient fixes his consciousness on the act. In making examinations of healthy men for Life Insurance, I have often observed that the healthiest hearts will beat hurriedly and unnaturally, because the candidate was conscious that I was listening for disease.

It is related of a gentleman resident of Baltimore, a Col. Townsend, who by an effort of the will could, at any time, cause an apparent cessation of all the vital functions so that the *heart's action could not be perceived*, nor any respiratory movements be observed. It is possible that we possess some will-power on the heart, and that this influence might be increased by cultivation. I can imagine cases where it could be exercised with benefit.

We can therefore avoid derangement of the heart's action by regulating our mental and physical life.

There is a hygiene of the heart, as well as a hygiene of the brain.

If we know what influences to avoid, we can prevent many troublesome and serious cardiac disorders.

## THE INFLUENCE OF THE EMOTIONS

upon the heart is direct and indisputable.

If the emotions are not intense—and the heart strong, no bad results follow.

But if the emotion is sudden, powerful and overwhelming, the heart may be damaged beyond recovery.

There is a most intimate relation and correspondence between the spiritual and physical heart. This connection has been asserted and believed in by common consent, by all nations, and since time began. The poets and theologians of the world, of whatever nation and creed, speak in one common language in this respect, making the heart the seat or centre of the passions and emotions.

We continually use phrases like these: "A broken heart," "a heart full of love." We say, "a man has a heart," or that "he has no heart," that such an emotion "comes from the heart," and another "comes from the head," and we know instinctively what is meant by each expression. All the grand, noble, loving and impassioned impulses are said to come from the heart, while the cold, unemotional, and more practical, come from the head, *i. e.*, the brain.

As a rule, what is deeply rooted in the natural convictions and expressions of a people, have their origin in truth, and this accepted correspondence between the feelings and passions of the soul and the physical heart, which is the central life of the body, and love which is the central life of the soul, is based on the grandest of all natural truths.

Morbid and unnatural emotions and passions injure the mind, and may also injure the heart. But how?

The various emotions and passions—which are named fear, terror, fright, rage, anger, joy, anxiety, care, etc., may all act in two different ways.

(1.) By stimulating or exciting the heart's action through the brain, acting on the *accelerator* cardiac nerves. Who, that has felt the influence of these emotions, has not felt his heart throb and palpitate, and send unwonted currents of blood to the face until the temples beat and the cheeks flushed. This is more especially the effect of the pleasanter emotions, such as joy, expectation, love, etc.

(2.) All these passions, when abnormal or intense, may have a profounder effect. There is no stage of excitement, or it is very transient,

and in its place, comes a dangerous depression of the heart's life. In such cases the heart seems to stop, or hesitate, or give great heaving surges, and the face becomes pale, the extremities cold, the pulse grows weak, and finally disappears and fainting supervenes. Now, fainting is a suspension of the heart's action. It is the step nearest death; only a mere line divides the two conditions.

The heart may be paralyzed in two ways—by over-distension, and nerve lesions. In the former the blood rushes to the heart in such overwhelming quantities that its cavities are distended so greatly that they cannot contract, then comes paralysis or rupture. In the latter the morbid influence sent from the brain to the heart, has the same effect as if a powerful galvanic current was sent through them; they become paralyzed and the heart does not receive its usual motor power. In this way fear has killed many, and I have reason to believe that the influence of fear on little children, has often resulted in chronic heart derangements.

Mothers, and fathers too, should be very careful how they punish their children by acting on their fears. They may entail upon them life-long misery, without in the least improving their moral

condition, because no child ever becomes better by being subjected to fear. Love is the only influence that acts with permanent good effect upon the mind and heart of a child. Great fear and terror in adults may be attended with the most serious results. The most observable symptoms of terror are general trembling, coldness of the extremities, cold, pale face, with sweat all over the body.

If no fatal results follow, repeated seizures of great fear, or even a single seizure are frequently followed by permanent weakness of the inhibitory or *restraining* nerves of the heart, and the victim becomes the subject of an *irritable heart*. Every physician meets with these cases, and during the period of the civil war, this disorder attracted the attention of such eminent medical men as Austin Flint and S. Weir Mitchell, both of whom wrote concerning it.

The effects of fear cannot always be guarded against. The tendency to be frightened or affected by terror is often inherited, often constitutional, and often acquired during childhood, the result of inhuman treatment. Such subjects can no more prevent attacks of terror, even from apparent inadequate causes, than some persons with

peculiar delicacy of constitution can avoid "taking cold."

But it is worth while for all persons to cultivate coolness of temperament, and a certain degree of stoicism. We have more control over ourselves in this respect than you are aware. Ask the soldier of his experience, and he will tell you that a large proportion of his profession are seized with paroxysms of fear at the beginning of, or during a battle, but that repeated efforts of the will enable them to soon overcome the tendency, which some unthinking persons call cowardice.

Numerous interesting cases are on record, which show the profound effect of fear on the heart's action. A medical student, while being initiated into the rites of secret society, had his eyes bandaged, a ligature bound around his arm, and the usual preparations were made for bleeding. A pretence of opening the vein was made, and a stream of water was spurted into a bowl to represent the sound of flowing blood. As a result the victim became pale and fainted. There is also a well-authenticated case where a man was pricked by a pin while blindfolded; warm water was poured down his arm, and trickled off

his fingers. He died from the effects of fear, and *expected* death, for he had been told he was to be bled to death.

During epidemics of cholera, fear is a prominent factor in the fatality and frequency of the disease. Some minds are so organized that the near presence of a dangerous disease so depresses the vitality of the organism that neither the mind or the body can resist its onset. If seized with the disease, they are pretty sure to die—usually from fear. Many die from fear who have not any disease. They succumb from fear before they are attacked. It is related that during a cholera epidemic in Cincinnati, many died in a few hours after the decease of members of their family. They fell into a condition of nervous collapse, which ended fatally, without showing a single symptom of cholera!

We know of examples, where fear prevents fainting so long as it operates, but immediately it is withdrawn, the system yields to the reaction and fainting occurs.

A lady, sitting up after the rest of the household had gone to bed, saw a servant enter the door, with a pistol in his hand. She immediately blew out the candle, pushed the bed

from the wall, got behind it, and succeeded in evading him, and getting out of the door and locking it behind her. She awoke the house, and *then* fainted.

Analogous to this are those cases in which delicate women have stood for hours assisting in some severe surgical operation, or supporting a loved one in the agonies of suffering, but who, when the scene was all over, faint dead away, and are restored with difficulty.

In these instances the effort of the will keeps up the tone of the nerves, which go from the brain to the heart, until the time of necessity is over. *Then* the will ceases to act, and the nerves to convey force to the heart, and it ceases to beat.

#### ANGER AND RAGE.

The effects of anger and rage upon the action of the heart is almost the opposite of that of fear. Instead of the coldness and fainting, we find rapid and tumultuous beating of the heart; the face becomes turgid and swollen, the temporal arteries throb, and the whole body, even to the extremities seems to partake of the same condition. In some cases the eyes become "blood-shot," and blood flows from the nose. In other



cases apoplexy has been known to occur, and carry off the enraged man. All these symptoms denote the excited and innerved or *tense* condition of the heart's muscular tissue. In such cases bleeding from the lungs has been known to occur.

But people often "turn pale with rage." What does this imply? Simply that the irritation of the heart is so great that it *cannot beat hard*. It is closed tight upon itself, almost to the degree of spasm. It does not appear to beat at all, yet there is *no fainting*. It is the opposite of paralysis with distension, and the brain and muscles are not deprived of blood.

In proof of this assertion, that rage does not paralyze the heart, is the fact that the emotion has been known to cause that fearfully painful affection known as *angina pectoris*, which is now believed to be a *cramp of the heart*.

There is a condition of the mind which might be termed *chronic* anger, as when the mind dwells wrathfully upon some real or fancied wrong until it becomes the one dominant idea. This is allied to *anxiety*, and has a similar effect upon the heart. It causes a heavy oppression in the region of the heart, with irregular or inter-

mitting pulse, and often leads to permanent disorders.

It is imprudent and even dangerous for us to allow such a passion to get possession of the mind. We can and ought to prevent it by a firm resolution, and the exercise of a christian and forgiving spirit.

It is not only good for our souls—our spiritual hearts—to *forgive*, but it is better for the well-doing of the physical heart. When we forgive a wrong, or trust implicitly in a Divine Providence to *right* everything, then the mental and physical strain relaxes, and we gain in mental and physical integrity.

The emotion of *Joy*, especially when sudden and unexpected, is very apt to influence the action of the heart in a remarkable manner. Its beats are at first greatly accelerated, and its action is excessive. It throws the blood in torrents all over the body, particularly the head. The face becomes flushed, and burns with intense heat. In strong, robust persons the arterial storm may subside and leave no derangement behind. But in a person with an already weakened heart, the consequences may be troublesome. The reaction, or secondary effect, may be *fainting* ;

which may occur so soon after the onset of the emotion, as to appear to be a primary effect. But a close observer would doubtless discern a brief period of excitement preceding.

Lord Eglinton informed John Hunter "that when two soldiers were condemned to be shot, and one of them to receive a pardon, the event being decided by the throwing of dice, the one who proved successful—thus securing a reprieve usually fainted, while the other remained calm."

The American poetess, Lucretia Davidson, who died at the age of 17, often fainted when listening to some of her favorite melodies from Moore, yet, notwithstanding this, she would beg to have them repeated.

A doorkeeper of Congress, an aged man, died suddenly on hearing the news of the capture of Lord Cornwallis's army.

These are instances of fainting from joy. In the first case the heart, though weak, was able to bear the strain. In the last instance the heart, weakened by age, was fatally injured by the sudden excitement.

We see from these cases that there is danger even from one of the most delightful of emotions.

We should guard our minds from feeling strongly the influence of any emotion.

There are those who are constitutionally so organized that they feel exquisitely any and all the emotions ; there are others so differently organized that only the profoundest emotions stir the depths of their stoicism.

Stoicism is a mental state that can be cultivated in most of us, especially when the nervous system has not lost its tone. The difficulty is that very susceptible persons are either born with an irritable nervous organization, or it becomes an acquired condition.

Grief, care, and anxiety, alone or combined, are very potent influences in injuring the integrity of the heart. Dr. Richardson says, "I have never met with a case of intermittent pulse in which the disorder was not sequential to some anxiety, shock, fear, sorrow, or their similars." Of course he refers to disorders of the heart, not organic, or rather *not* due to rheumatism ; for it cannot be disputed that this long continuance of great anxiety, is capable of bringing on actual structural changes in the heart. Bonnet, Morgagnè, T'issot and others assert that dilatation of the heart has been caused by chagrin and anger.

From statistics we learn that in the last twenty years deaths from heart disease have increased about twenty-five per cent., and that the percentage of the increase is entirely confined to men; and to those between the ages of 21 and 45, which is the time during which they are subject to the most trying emotional influences. I imagine the reason why the percentage has not increased with women is because they are exempt from many of the intense emotions to which men are subjected. Women do not but seldom participate in exciting speculations, and therefore escape the shock of financial crises which injure so many. They do not engage in political controversies with its extremes of hope and anxiety, and the intense mental strain with which it is always attended. This is one of the most potent arguments why women should not strive to attain the exercise of suffrage. Their more delicate nervous organization would sooner succumb to the unwonted excitements to which they would be subjected, and then statistics would show a larger percentage of heart-disease, as also disease of the brain and nervous system. Worse than all, the injury would not be confined to themselves; they would transmit this enervated con-

dition to their offspring, entailing upon them interminable sufferings.

*Homesickness* is a condition in which grief and anxiety are commingled. It is a well known fact that Swiss and other soldiers taken from their native mountains, often die of homesickness, and with symptoms which closely resemble fatal weakness of the heart.

It has been observed by African travelers, among whom are Livingston and Baker, that when the natives belonging to some of the interior tribes are taken from their homes by force or bribes their sufferings from homesickness were intense and sometimes fatal. These sufferings were not only mental but physical, for when asked to point out the seat of their evident suffering they indicated correctly the region of the heart. These same authorities further assert that those who died, showed all the evidences of death from cardiac disease.

The sudden shock caused by *grief*, sorrow and kindred emotions, act in a manner nearly opposite to joy.

When we hear of the unexpected death of a dear friend; the loss of all our worldly goods; or of some other great calamity, the heart seems to

stop beating. In fact, the heart hesitates, and often does stop, and syncope occurs. The blood is not thrown to the brain, and consciousness is lost. This condition, often caused by fright, terror, the sight of blood, or even expected suffering, often simulates death so closely as to deceive the most expert physician. It may actually cause death by rupture of the heart, or spasmodic closure of its cavities for such a length of time as to preclude recovery. But if restoration occurs the heart has received such a strain that it may take that organ weeks and months to regain its original tone : or it may not recover at all, but lead finally to one of the many forms of organic disease.

There is another form of disease resulting from grief which is too important to be omitted from mention here. It is a condition of general debility, termed by medical men *anæmia*, or bloodlessness, or a condition of the blood in which the red portion is deficient. The process by which a weakened heart causes this condition is often too complex to be explained to non-professional minds. It may briefly be described however, as a condition of the heart which prevents its normal function of throwing the blood to all the tissues

and organs of the body. In consequence of which the skin becomes cool and pale, the extremities cold and emaciated.

As a result of this imperfect circulation the muscles become pale and flabby, the nerves insufficiently nourished, and every organ has its vitality impaired. As a direct result of this, we find the patient suffering from muscular debility, nervous debility, neuralgia, dyspepsia, derangement of the liver, and all the blood-making organs. *Impoverished* blood is a certain and sure result of an insufficient supply of blood, and all these abnormal changes are due to a condition of the heart which may have originally been caused by the shock of unrequited affection, disappointed love, or the death of a beloved one.

After the great fire in Chicago, it was observed by medical men, that a larger proportion than usual, of the diseases they were called upon to treat, was due directly and indirectly to derangement of the heart. Probably no event in the history of this country ever caused such intense and profound shock to those interested, as the great fire.

The first effect in nearly all cases was a fierce and terrible excitement of the heart. Those who



remembered their sensations during that terrible day and night, told that the beating of their heart was so quick and hard that it seemed striving to break its way out of the chest. This condition was greatly aggravated by the severe physical exertion to which nearly all were subjected. The secondary effects however, were those most manifest after the dreadful days were over. The excited heart-storm became lulled, but it was the deceitful calm of debility. The care and anxiety, the sleeplessness and enforced exertion of mind and body increased this cardiac debility. The heart's action became quick and weak, or irregular or intermittent. All the organs, especially the brain, suffered from lack of blood. The brains of many became very irritable, and insanity ensued. In others the brain became anæmic and a profound melancholy took possession of the victim, who after ended his life by suicide. Those who recovered did so by change of climate, or a constitutional elasticity which enabled them to resist the effects of debility. It may be asked, do none of the emotions act in a beneficial manner on the heart and the general system? I reply that the action of the emotions is like the action of food and medicines. In proper and moderate

doses they do act beneficially. But there is a difference in the essential character of the emotions. The depressing emotions never cause any beneficial effects upon the physical body, although they may upon the spiritual life. The exhilarating emotions however act as stimulants and tonics, and actually increase the vitality of the heart and body, unless they are experienced in excess.

Joy, moderate and continuous, increases the vital manifestations of physical and mental life. *Love* actually increases the health of its happy possessor, unless it is marred by such depressing emotions as jealousy and envy. *Hope* is such an exhilarating tonic that it has carried many through great and depressing trials, and raised many from the lowest conditions of prostration, both mental and corporeal.

#### THE INFLUENCE OF DIET UPON THE HEART.

The same great nerves which go to the heart from the brain and spinal cord also send branches to the stomach and other organs concerned in the process of digestion.

The stomach and heart are in closer sympathy than is suspected by the great masses of people. Any irritation of the coats of the stomach from

improper articles of diet, or any substance taken into that organ, can, by irritating its sensitive nervous supply, send an influence to the cardiac nerves, which may, even in a healthy heart, cause it to beat more forcibly and rapidly than normal.

This will occur if the stomach is perfectly healthy, but if the digestive organs are diseased, then the morbid influence sent to the heart is sent with greater force, and has a greater effect. What, then, must occur if both stomach and heart are in a weak and irritable condition? Evidently such an amount of irritation as will cause the heart to act so unnaturally as to simulate serious disease of that organ.

It is doubtless a fact, too, that repeated errors in diet, such as overloading the stomach with indigestible food, and the use of stimulants, may, by constant reflex irritation, weaken in time the healthiest heart.

Bearing these facts in mind, common prudence and judgment would dictate to us that if we observe any undue action of the heart, or flushings of the face and fullness of the head, even if we are not conscious that the heart itself is disordered, we should seek to ascertain the offending articles of diet and banish them from the table.

I will try and point out a few of the articles which are most likely to act in the manner above pointed out.

In some persons, mostly those of full and plethoric habit, the habitual use of *meat*, especially if it forms the principal portion of each meal, causes increased labor to be performed by the heart. This may arise from the highly-stimulating character of such food, as also from the unnatural amount of blood manufactured from such a diet. This increased labor may have effects of a diverse character in different forms. If the individual has general muscular debility, it would probably cause enlargement of the cavities of the heart, with thinning of its muscular walls, and this condition implies great weakness and irritability of that organ. The results would be palpitation of the heart after each meal, and after any unusual exercise, going up stairs, running, etc.

Another result, of quite an opposite character, would occur in persons of large, strong muscles, with an excess of blood. The already strong muscular structure of the heart, being constantly fed by a great blood supply, and working hard to distribute such supply, will grow in size and strength, as a blacksmith's right arm grows, until a condi-

tion of the heart obtains which is known as *enlargement with thickening* of the walls of the heart.

Men who are engaged in athletic sports as a business or a pleasure, are necessitated, from the nature of their avocation, to adopt a peculiar diet. Boating, base-ball playing, gymnastics, pedestrianism and pugilism all require that their votaries shall "go into training," which means that they must go through certain processes of rubbing, bathing and exercise, and also feed almost exclusively on animal food. All this is done to increase the size and strength of each muscle in the body, especially those which are to be used in the special business or pleasure in which the person engages.

But this increase in muscular power is often gained only to bring with it so much abnormal power in the heart as to lead to serious if not fatal consequences.

Dr. Richardson, in his "Diseases of Modern Life," has correctly pointed out the dangers to the heart of this excessive physical "training," or rather *over-straining* of the muscular system. He says : "The exact mode of death from physical overwork is by the destruction of those parts of

the body on which the involuntary acts of life depend, viz., the muscles and nervous structure engaged in the digestion of food, the circulation of blood and the respiration. \* \* \* The *heart* by nature is endowed, as an active organ, with extreme powers of resistance and endurance. It also possesses in a limited degree the property of renovating itself, and even of becoming larger and more powerful as it is subjected to undue labor. Hence in purely natural states of existence, as in the primitive life, when good food and good air supply perfect blood for building up the tissues, the heart will continue to an advanced age to support an action considerably beyond the merely required range of its functions. In our own country, in rural districts, we frequently meet with men who are accustomed to run, leap, carry heavy burdens or walk unusual distances per day until an advanced age, and without great suffering.

On listening to the hearts of these men, we find, however, the beat unnaturally strong; and as they approach their decline they invariably complain of breathlessness, and of symptoms indicative of an oppressed circulation."

This same writer explains that this increase in

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the power and size of the heart leads to serious congestions of various organs—as the head, causing apoplexy; the lungs, causing bleeding; and the liver, causing bilious conditions. He mentions especially that the victims of these accidents are those who are addicted to the “so-called athletic sports, such as foot bail, boxing, rowing, leaping, running, etc.

There is a disease of the large blood-vessels of the body called *aneurism*, meaning a rupture of one of the coats of the artery, allowing that portion to *pouch*, and form an enlargement at the point injured. This disease is caused by an excessive action of the heart, throwing such an amount of blood into the arteries that it cannot be carried through the system, but is thrown back by *concussion* upon the heart, and thus mechanically injures the wall of the artery.” Dr. Richardson describes several other forms of disease caused by increased muscular power of the heart, many of which are necessarily fatal.

There is a peculiar form of heart-disease which is brought on by a diet of *fats*, or those substances like sugar and starch, which are, in some persons, rapidly converted into fat. I allude to “fatty hearts.”

There are two forms of this disease. We seldom find them separately, however, for the causes of one are the causes of the other.

In one variety the heart is loaded down with an accumulation of fat deposited upon it. This interferes with its action and embarrasses its motion, and leads to great weakness and irregularity. The other variety is when the muscular structure becomes permeated with fat, or, as some would define it, the muscular fibres become transformed into fat.

These diseased conditions rarely occur except in persons who are disposed to grow fat, or become *adipose* from constitutional or hereditary tendency. The whole body shares the habit of fatty deposits. Such persons should carefully watch this tendency, and if they discern any symptoms of weakness of the heart, or oppressed breathing, they should strictly eliminate from their diet all fats, sugar, starch, and alcoholic or malt liquors, and live on lean meats, well-baked bread, and similar *non-fat*-producing articles.

#### COFFEE.

Among the articles in common use in nearly every country is the berry of the coffee tree.



This berry in its crude state may be considered a poison to the nervous system. For this reason it is always subjected to a process known as "browning," or roasting, which drives off a portion of a semi-volatile principle known to chemists as *caffeine*, and is a specific poison to the heart. Experiments on animals demonstrate that it at first causes increased action of the heart with a rise in the arterial pressure, but this is soon followed by a corresponding decrease of pressure, and the heart soon becomes paralyzed. In the same experiments it was observed that the spinal cord was irritated to such an extent that tetanus or "locked-jaw," occurred. The excessive use of coffee as a beverage sooner or later breaks down the tone of the nervous system; next it interferes with digestion to such an extent as to almost arrest that process. I have treated very many cases of chronic and obstinate dyspepsia that would yield to no remedy until the patient gave up the use of coffee. To such an extent is the digestive organs weakened by coffee that the food is hurried through the stomach a short time after it is swallowed, and before it has had time to be absorbed as a nutritive agent. Even if food is retained it seems to pass along the diges-

tive tract without passing into the absorbent system.

The strongest organism cannot long withstand such a deprivation of nutriment, and the *heart* soon becomes as weak as the stomach, and this increases the dyspeptic condition to an alarming degree.

There is but one class of persons with whom coffee agrees, namely: those whose avocations necessitate great exertion and labor in the open air. Soldiers, sailors, hunters, miners, etc., can drink an amount of coffee in a day that would soon destroy the integrity of the nervous system and the digestive organs in persons of a sedentary habit. The reason is that the active exercise causes profuse perspiration and great destruction of tissue elements. All this waste is accompanied with elimination of the coffeeine from the blood. But if coffee is used by persons whose life is spent in repose or indoors, the coffeeine is retained in the blood, and the nervous system is rapidly poisoned by its injurious influence.

Ample opportunity to observe the effects of coffee on the two classes—the active and the sedentary—was afforded during the late civil war. It was observed that men who for years

had been victims of dyspepsia—who could not drink a cup of coffee without much suffering—whose hearts were feeble, and whose whole constitutions were so deranged that they barely passed an examination, after a few weeks in the army, exposed to the active exercise incident to a soldier's life, could drink the strongest coffee three times a day, without feeling any of its former injurious effects. These men, unless subjected to imprisonment in close and unventilated quarters, generally came back to civil life with robust health and powerful digestions. But it was observed that on renewing their sedentary occupations, coffee became to them as much of a poison as before, its use bringing on the same train of digestive derangements, palpitation of the heart, headache, etc.

"The deductions to be made from these facts are, that persons of sedentary habits, with feeble circulation, and nervous irritability, should abstain from the use of coffee. The most troublesome cases of heart-disorder I ever treated were induced by the excessive use of that delicious French beverage, *café au lait*.

#### TEA.

Tea exercises a more baneful influence on the

heart than coffee. The alkaloid *theine* is very analagous to *coffeine*, but has a greater tendency to injure the nerves which regulate the heart's action. One of the first symptoms of excessive tea-drinking is a sensation of "sinking," faintness, or weakness at the pit of the stomach. This symptom is generally a sure indication of cardiac debility. If the use of tea is persisted in, other symptoms supervene, such as *trembling* of the heart, which corresponds to the trembling of the hands which so annoys the tea-drinkers. Afterwards come palpitation of the heart, sighing respiration, feebleness of circulation, cold extremities, great sensitiveness to atmospheric changes from cold to hot or *vice versa*. The neuralgia which comes from tea-drinking is the result of cardiac weakness, and usually subsides after the use of tea, particularly green tea, is abandoned, or some cardiac tonic is taken to antidote its effects. I allude to green tea, because green tea corresponds to unroasted coffee. Black tea is subjected to the action of artificial heat during the process of drying; it is in fact *roasted*, and a large portion of the *theine* is driven out of the leaf.

*Green* tea is cured by the natural heat of the

atmosphere, or a low degree of artificial heat, and thus retains a larger quantity of its *theine*.

Tea differs from coffee in never causing *primarily* such an intense dyspeptic condition. The weakness of the stomach is a secondary symptom due to its enervating influence upon the heart. A weak heart causes a weak stomach. A weak heart implies a deficient supply of blood to all the organs. A deficient blood-supply diminishes the functional activity of every organ. There is one exception however to this, and one which I confess I cannot satisfactorily explain. I allude to the action of tea upon the *brain*. It seems to increase not only the functional activity of the brain, but its endurance of mental labor. I have always thought that tea, like the Indian "Hash-hesh," had some specific, stimulating influence on the purely psychical portion of our system. Certain it is that amid the general debility of the nervous and physical organism caused by tea the power and activity of the intellectual faculties remains not only unimpaired, but actually increased. To this cause I refer the sleeplessness caused by tea, and not to the deprivation of the brain of its usual amount of blood, as is the case with other drugs which weaken the heart.

But the literary man and intellectual laborer should not live on the influence of tea alone. Unless the tea-drinker takes a sufficiency of nitrogenous food to manufacture blood and nerve tissues, the constant intellectual strain will tell upon the brain, and the general health will soon be so wretched as to diminish the *physical* capacity for mental labor. A man or woman can drink large and repeated quantities of an infusion of black tea without any general injurious effect, if they will at the same time live on a strong, nutritious diet.

I would advise that *green* tea should never be used. It is rarely used in China, Russia or England, countries which consume more good tea than all the rest of the world.

Black tea is not much better if cooked as green tea is, namely, quickly *infused*. Black tea should be made by *decoction* (steeped or boiled). The longer it is steeped the less *theine* remains, and the greater is the amount of nutritious matter extracted. Tea leaves contain nearly as much nutritive material as peas or beans, and more than any other leaf. It is the custom in some countries—and a very good one—to eat the leaves after the decoction is drunk. It would be

quite as sensible to throw away beans or rice, and only use the liquid portion of the soup as to throw away the leaves and only use the infusion.

## TOBACCO.

The use of tobacco in some form is well nigh universal throughout the world. It is more generally used than tea and coffee, for there are countries where the latter are scarcely known.

It were useless to inveigh in general terms against the use of this drug. If it were always as deleterious as some assert it would not be as extensively used. I do not deny that it is a poison, but so are many other agents which enter into our daily life as food or beverage.

In large quantities, *i.e.*, large enough to cause death, it has the following effects:—"The *brain* is found empty and pale; the *stomach* is reddened in round spots, so raised and pile-like that they resemble patches of dark Utrecht velvet; the *blood* is preternaturally fluid; the *lungs* are pale as a lungs of a calf when we see them suspended in the shambles; while the heart overburdened with blood, and having little power left for its forcing action, is scarcely contracting, but is feebly trembling, as if like a conscious thing it knew

equally its own responsibility and its own weakness. It is not beating, it is fluttering; its mechanism is perfect, but each fibre of it to its minutest part is impregnated with a substance which holds it in bondage and will not let it go."

I have seen cases of accidental poisoning from tobacco, in cases of children, when the ear placed over the heart could detect only this faint tremulous motion, and so feeble was its action that no wave reached the wrist.

While it would be difficult to prove that tobacco ever caused structural disease of the heart, there is no doubt in the mind of any medical man that it is capable, even in moderate use, of causing troublesome functional disorders. By functional disorder I mean what is generally known to the public as nervous derangements. It is a condition of the nerves and muscles of the heart that causes it to act feebly, irregularly, and too excitedly. It is an increase *of action* without an increase of *force*. I have had many opportunities to observe the effects of tobacco on the heart, especially in inveterate smokers, and the symptoms are not only unpleasant, but at times alarming.

These symptoms often appear suddenly, and after the smoker has used tobacco for years with



apparent impunity; and they may last for hours at a time. They are characterized by palpitation, a sensation as though the heart were rising into the throat, a feeling of breathlessness, and an insupportable pain in the region of the heart. Pain of a spasmodic kind extends also to the muscles of the chest, and occasionally to those of the arm, especially of the left arm. I have had patients who were supposed to be suffering from that terrible form of neuralgia of the heart, called *angina pectoris*, and for whom no medicine gave relief till they abandoned the use of tobacco. Of all the ways of using tobacco the smoking of so-called "good" cigars, *i. e.*, strong cigars, is the most injurious. The pipe, unless the strongest tobacco is used, is less apt to injure the heart. Cigarettes, unless smoked to great excess, do not injure the nervous system as badly as cigars, because they are made of Turkish or Latakia tobacco. The safest and pleasantest manner of using tobacco is in the Turkish *Narghile*. In this the tobacco smoke passes down from a bowl, through a vase of water, generally perfumed, and thence through a tube several feet, or even yards long to the lips of the smoker. The smoke in passing through the water and the tube, parts

with nearly all its poisonous principle, nicotine, and other irritating constituents, and reaches the mouth cool and mild.

I have experimented a good deal with various flavors and disinfecting substances. Of all flavors the oil of sassafras is preferable, not only on account of its pleasant taste and odor, but because it possesses some principle which seems to antidote the narcotic action of tobacco. Eastern nations prefer the rose to all other flowers. I have tried carbolic acid, but its action on the odor and effects of the smoke seems very minute, while its own odor soon becomes disagreeable. Salicylic acid has no odor or taste, and imparts none to the smoke; at the same time it seems to deprive it of much of its offensiveness. A little glycerine or extract of liquorice added to the water gives a sweetish taste to the smoke, which is pleasant to some persons. If I should be asked the question, "Is tobacco ever beneficial to the heart?" I should reply in the affirmative. My own observation has convinced me that moderate smoking is beneficial in two conditions of the heart, namely (1), an over action of the heart, as after severe labor or great mental excitement, when it beats with undue force and unnatural

rapidity. (2.) In cases of enlargement with thickening, or when the heart muscle is too strong and powerful. In these cases tobacco, if used carefully, and at the proper time, acts as a calming and restraining remedy, soothing the excited heart, and acting in all respects as a curative medicine. But persons having an already weakened heart should not use tobacco. Nor should any one with a heart organically diseased, except the enlargement above mentioned.

It is especially to be deprecated in young persons—those under eighteen or twenty years of age—for not until then has the heart, or any other muscle attained its mature strength, and consequently is before that age more easily weakened. Tobacco is much less injurious when smoked in the open air than in a close room, for the reason that in the former case less is absorbed into the blood through the respiratory organs.

#### ALCOHOL.

When speaking of articles of food, I advised the avoidance of fats and sugar in persons disposed to corpulency or obesity. The same advice will apply to all fluids containing a large percentage of alcohol, and to malt liquors.

Sugar, starch and alcohol change to fatty elements when assimilated by the body. This is a general rule, or rather, *the* rule in certain constitutions which are disposed to make adipose or fatty tissue. They not only cause an excessive deposit of such tissue all over the body, but especially upon and in the heart.

When fat is deposited upon the heart it accumulates in excess in the same location of the normal deposit, which is upon the auricles. When an abnormal deposit occurs, it interferes mechanically with the free movements of the heart, weakening the strong heart and almost paralyzing the already weakened heart.

But alcohol causes more serious disease of the heart, namely, *fatty degeneration*, "an interposition within the fibre of a fatty substance by which the true muscular elements are partially replaced, or a degeneration produced by an excess of fluid between the muscular elements." "In these states the power of the heart to propel the blood is enfeebled, and, although for a much longer time than might be expected the heart responds to the agent that is destroying it, and continues to beat more freely when the extreme vessels are paralyzed and the arterial vessel is weakened, a

time at last comes when the absence of the recoil is the forerunner of death. For it is by the recoil of the great arteries that the heart itself is fed with the sustaining blood. When, therefore, this back stroke of the circulation is greatly weakened, and the flow of arterial blood through the heart is reduced, then the nutrition of the pulsating organ is impeded, and the over stimulant failing to stimulate, becomes even a depressent." (Richardson, *Dis. of Modern Life*.) In this condition of the heart a slight cause may lead to fatal results.

A mental shock, a mechanical strain, an exposure to cold, or unusual abstinence from food, are often sufficient to break down completely in a brief hour the enfeebled organ of circulation.

Of course I have alluded above to that excessive use of alcoholic beverages which brings about a condition which we term *alcoholism*, and which will change the most robust organism into one utterly shattered and debilitated.

But the moderate, and what is termed the medicinal use of alcohol, in the form of wine, or beer, or spirits of any kind, may, under certain conditions, cause a similar state of disease.

We will suppose a case of a person debilitated

by any disease. The person is emaciated ; he has a weakened heart, because the heart is emaciated ; he is advised to take whiskey alone, or with codliver oil. At first he is benefited, unless the dose is too large—but he finds it difficult to discontinue its use after he has regained his normal strength. He can leave off the oil, but he misses the stimulating effects of the alcohol, and, unaware of the danger, he continues its use, the dose generally increasing day after day. Soon the deposition of fat or water in the body becomes abnormal, he grows adipose or dropsical, and in time gets a weakness of the heart which cannot be cured.

Physicians are not cautious enough in prescribing alcoholic stimulants, or tonics associated with alcohol. They do not warn their patients of the danger of too long use of stimulants, or tell them when they should leave them off.

My practice brings me into frequent contact with men in whom *alcoholism* had its origin in the medicinal use of spirits. I have met with many cases of estimable persons, ladies and gentlemen in the highest ranks of society, who could date the origin of a fatty heart in the too prolonged and excessive use of whiskey and codliver oil.

The excessive use of beer and porter tends to cause fatty degeneration, especially in those who have not been accustomed to use them all their lives.

Many Americans are advised to drink beer for the removal of chronic or acute debility, or for the purpose of increasing their *enbonpoint*. Not being accustomed to the use of such beverages, as are the English and Germans, the alcohol takes deeper hold of the system, and its affects are manifested in a deleterious manner, especially on the muscular structure of the heart.



#### IMPURE AIR.

The influence of impure air upon the heart is deleterious in the extreme. The heart needs for

its healthy nutrition as pure blood as does the brain or lungs. The healthiest hearts are found in persons residing in mountainous countries where the air is pure. The weakest hearts—as a rule—are found among those persons who live in dark, close rooms, on the crowded streets of great cities.

Why do people faint in crowded rooms, in churches or theatres? We say the air is “close,” but that does not explain it.

All faintings are due to deficiency of blood in the brain. This condition may arise from several causes.

(1.) Contraction of the cerebral blood vessels from vaso-motor spasm, as in hysterical fainting, or fainting from some emotional influence.

(2.) Weakness of the heart, which may be sudden and transitory, from mental impressions or excessive heat of the atmosphere, or organic fullness from disease.

But the fainting which most commonly occurs in crowded assemblies, is due to the noxious influence of carbonic oxide, and may affect healthy as well as unhealthy hearts. Some experiments have demonstrated that if a stream of carbonic acid gas is passed with the blood current, through



a healthy heart, it becomes paralyzed. Now, the same thing occurs when we sit in crowded, un-ventilated rooms.

The air of such is generally saturated with this pernicious gas. We breathe it into the lungs, it is absorbed and taken up by the blood and carried directly to the heart. Its effect on the heart is often felt without the occurrence of other symptoms, and the victim faints suddenly.

In other cases he feels a sense of stupor which steals away his consciousness.

This is due to the presence of the poison in the brain. In this manner act the fumes of charcoal under whose dread influence so many unfortunates pass into the unknown world. In heart poisoning by carbonic oxide the heart beats feebler and feebler, it sends a constantly lessening amount of blood to the brain, until there comes a time when the cerebral vessels are not filled, then fainting results. During such syncope the heart's action can scarcely be perceived. It has almost failed to distribute the vital fluid to the body. The extremities are cold and pale, the face pallid and pinched, and the pulse feeble or imperceptible.

What should be done to revive such persons?

Generally just the opposite of what *is* done, unless some physician or intelligent layman happen to be present.

The first impulse of the ordinary bystanders is to crowd around the patient, which only makes matters worse by adding to the already poisoned and de-vitalized air.

They then hold the victim in a sitting posture and throw water in the face, and perhaps unfasten the clothing.

The clothing should be loosened, but it will avail nothing so long as the air is not purified. The most efficacious method to revive such patients is to place them in a lying position, with the head *lower* than the body, in order that the blood-vessels of the brain may become filled. They should be carried near an open window or door, or into the open air, and should not be surrounded by a crowd of people.

When in this position, cold water may be dashed into the face, the hands slapped, and the body rolled gently from side to side. Soon the heart will feel the vivifying effect of an increased quantity of oxygen, antidoting the depressing influence of the carbonic acid gas.

After the great fire in Chicago, our law courts

were obliged to meet in any kind of structure which could be procured. These were necessarily small and unventilated, and the consequence was that many of our attorneys, and particularly the judges, suffered seriously.

One prominent judge of the Criminal Court came under my care. He suffered from a group of anomalous symptoms, which had been variously ascribed to fatty heart—fatty degeneration—hypertrophy, etc., but were all due to the continuous depressing influence of the atmosphere of the court room, in which he was obliged to sit eight or ten hours daily.

His symptoms were, attacks of semi-unconsciousness, during which sight and hearing failed, vertigo set in, and he was in danger of falling. His face became pale, his eyes dim, his hands cold, and he presented all the appearance of a person fainting. His memory became impaired, his sleep bad, and from a person of splendid physique and brilliant mind, he became depressed, haggard and apathetic. The heart's action was so depressed that it failed to supply the brain with sufficient vitality.

I make no doubt that for months his blood was scarcely free from the presence of carbonic

oxide. The air of the close-crowded room where his days were spent was vitiated by the emanations of hundreds of men of all classes and conditions, especially the lowest, until it became almost as noxious as that of the atrocious Black Hole of Calcutta, so notorious in history.

There is an element in the emanations of a crowd of the lower classes in a close room which is especially injurious to the vitality of the heart. I allude to the presence of the fumes of tobacco and alcohol.

These add largely to the amount of carbonic oxide which exists already in the confined air.

The gentleman above referred to received little or no benefit from medicines. If he remained away from the court-room a few weeks he would begin to improve, but on a return to judicial duties, the same symptoms recurred. He did not recover until he left the city, and breathed for a season the pure air of the mountains.

I doubt, indeed, if he ever fully recovers, and am very certain he will never be able to breathe the tainted air of a crowded court-room without suffering from its effects.

You are all aware how common it is for our

Legislators to sicken and die from breathing the deadly air of the dens which our people dignify by the name of "Legislative Halls." Every State in the Union has sacrificed many of its most talented men, by sending them to sit day after day and night after night in buildings most remarkable for their utter lack of ventilation. This has been especially the case in our State of Illinois. But even our National Capital at Washington has been disgraced by buildings for the meetings of the Senate and House, which if erected for the express purpose of killing off our statesmen, could not have been better arranged for that purpose.

The air of sleeping cars, churches, theatres, factories, and even the nurseries where our children sleep, is often loaded with this deadly poison—carbonic oxide—so deadly that it puts out the lamp of life, as certainly as it extinguishes a candle placed in it.

The sick-room is too often saturated with it, and grave doctors wonder why their patients do not rally more rapidly, when if they would examine into the ventilation of their patients' rooms they would find an answer to their question.

Thousands of the sick and feeble, especially

children, annually die in this city alone, because nurses and attendants, and even the patients themselves, are afraid to let in the pure air of heaven, or allow the poisoned air to escape.

A word as to the manner of escape of air containing carbonic acid:

*It is heavier than air.* Consequently ventilation *high* in the rooms will not favor its escape. The ventilation for this purpose should be placed in, or just above, the "base-board," not higher than a foot above the floor, and should have a flue or pipe extending upward within the wall, or outside of it, in order to create a draught. In the meantime a high ventilator will allow pure cool air to enter and fall into the place vacated by the impure air

## EXERCISE.

Under the head of Exercise I shall include all kinds of physical exertion. I shall first treat of those which, if carried to excess, may injure the *healthy* heart, and, secondly, those physical exertions which should be avoided by those whose hearts are not normally strong.

It may be stated, as a general axiom, that no organ of the body is so much affected by exercise as is the heart. The normally healthy heart's action is quickened by walking fast, riding on horseback, running, ascending heights, climbing, rowing and leaping. Even a change of posture, such as rising from a sitting or lying posture, will change temporarily the number of the heart beats.

There is hardly a more difficult problem than that of determining the natural bounds of physical exercise.

The labor that is almost necessary to the health and well-being of a tiller of the soil would be very injurious to the denizen of the city. The severe exercise of the mountaineer would injure the healthy resident of the plains, and the physical exertion of the boatman and sailor, which gives them the most robust life, would tell severely on the inhabitant of the country or the village.

Much of the value of active exercises depends on habits of life, either hereditary or acquired.

There are kinds of exercise which seem to belong to some people or classes, and cannot, with safety, be adopted by other people or classes, without long training.

The fashionable rage for athletic or gymnastic exercises is open to severe and deserved criticism, and I deem it my duty to show, by positive testimony from members of my profession, that incalculable injury may be done, and has been done, by undue and uncalled for physical strain. I will first quote the assertion of Dr. Richardson,



who, in his *Diseases of Modern Life*, boldly says :

“There is no sign, there is no evidence anywhere that the greater culture of the physical strength has favored the longevity of the individual, or the vital tenacity of a race. The observations made by the physicians of the Greek, Roman, Arabian, and Italian schools, respecting excessive physical exercise and the maladies incident to it, admit of but one rigid interpretation, namely : that such exercise ensures premature decay and early death. The facts to be elicited in modern times from the vital statistics of England, France and Prussia, lead equally to the inevitable conclusion that removal of excessive endurance tends to health and length of life, and that in each country, within its own population, the value of life is influenced to the favorable side by the reduction of the physical expenditure. The most striking fact of this kind is afforded in the history of the Jewish race. In no period in the history of this wonderful people, since their dispersion, do we discern the faintest approach to any system amongst them tending to the studied development of physical capacity. Since they were conquered they have

never, from choice, borne arms, nor sought distinction in military prowess ; they have been little inducted, during their many pilgrimages, into the public games of the countries in which they have been located ; their own ordinances and hygienic laws, perfect in other particulars, are indefinite in respect to special means for the development of great corporal strength and stature, and the fact remains that as a people they have never exhibited what is considered a high physical standard. And yet the broad truth stands forth, that this race has not only endured the oppression of centuries, without being lost, but as it exists now, scattered here and there on the earth, in different countries, and amongst the most varied social and natural conditions is, of all civilized races, the first in vitality. It would be impossible, and in truth unnecessary to enforce any stronger argument as to the negative value of excessive physical exertion in sustaining the vital force of a race.

In the course of centuries the most powerful nations have died out, and empires of perfect physical beauty and chivalric fame have passed away. But through all these vicissitudes one race, cultivating none of the so-called ath-

letic and heroic qualities, and following none of the exercises popularized as "bracing," "hardy," "invigorating," has held its impressible own, to remain a more numerous people in its totality than ever ; a people still presenting a more tenacious life than its neighbors, and showing, as it is relieved of the cruel restraints long forced on it, the continuance also of mental force and of commanding genius, in art, in letters, in politics, in commerce, and in science.

It may be added here that the mortality of the Jewish race from diseases of the chest, is very far below that of any other race. Among these diseases cardiac disease is enumerated.

It may be instructing to the reader to know how violent exercise injures the heart. There are two kinds of violent exertion which destroy the vitality of the heart. I. *Prolonged and systematic strain*, such as certain occupations require. This continued strain may be endured for years and show no serious effects on the circulation.

Among certain tribes of American Indians a class are trained from childhood as "runners." These men become capable of running all day by the side of a horse or sledge, without appearing

to show signs of fatigue. But they finally "wear out," and the majority of them die prematurely.

Dr. Richardson believes that in cases of heart-failure from prolonged daily strain, the injury begins in the right ventricle cavity. The walls of this chamber which has to keep the circuit of blood supplied through the lungs, are naturally much thinner than the wall of the left ventricle, which carries the blood all over the body. If this right ventricle, which has to make say 100,000 strokes in twenty-four hours, and thereby drive over the lungs 18,750 lbs of blood, be taxed beyond its natural power of endurance, if it has not a certain number of hours, say eight, for what may be called easy work or play, and another certain number of hours, say eight more, for work at less pressure while the body sleeps, it must of necessity weary in its duty. But as the heart *must* supply itself with food—that is to say blood—for its own nutrition, and whenever it fails to supply the body, it fails first to supply itself. Thus, from overwork it soon becomes enfeebled, and most easily in that part of it which feels primary fatigue. This feebleness of the heart is not felt at first in vigorous persons, but

when the age of forty or fifty is reached the feebleness becomes very noticeable. None but medical men know how many persons die from this one source of physical failure, or how insidiously the symptoms of worn-out heart make their progress through all classes of the laboring community. The general symptoms indicating failure are that the victims begin to lose something of their physical power, not in the limbs, but in the body. The breathing becomes embarrassed from slight causes. Rest is more frequently required. They suffer unduly from alternatives of heat and cold. They feel an internal exhaustion or vacuity, which they refer to the chest. Finally, some organic change in the lungs, kidneys or brain sets in, and ends fatally.

II. There is another kind of heart-failure much more sudden and fatal in its effects. It is that resulting from some very *sudden and violent physical strain*. This may result from excessive *action* of the heart, or from sudden *arrest* of action, or over-distention. There are also cases where this sudden physical heart-strain has been complicated with some sudden mental emotion, like rage or grief. It is believed that actual *rupture* of the heart, a real "broken heart," has

resulted from such double strain. But I will take up the three causes separately, and explain the manner in which they cause serious nervous or structural disease of the heart.

*The effects of sudden, violent heart-strain* may be brought on by several means. The most common is the act of *running*. During this act the heart has to make up the waste of force by excessive action. A healthy heart which beats normally 72 per minute, and will, when a person is running, violently beat as many as 120 per minute; and the *force* of its action is proportionately increased. Many people have perfectly healthy hearts who are not accustomed to violent running. In such persons this act is as likely to injure the heart as it would any other muscular structure not accustomed to violent use. We will suppose a healthy man who never, or rarely, struck a blow with a heavy hammer or sledge. We will also suppose that he attempted to use one as a blacksmith does for many successive hours. What would be the result? Undoubtedly such over-strain of the great muscles of the arm as would result in paralysis or serious inflammation.

During my residence in this city, I have

treated many cases, and heard of many more, wherein serious and even fatal injury to the heart has resulted from

#### RUNNING TO CATCH THE CARS.

Men or women who are accustomed to a quiet life in the house or office, will thoughtlessly run violently to catch a street-car at the corner, or a steam-car at the station. There is often added to this physical exertion some mental anxiety. Nothing could be more dangerous and imprudent. The hearts of those leading a sedentary life are entirely unfitted for such violent exertion. The right chamber is generally injured, because of the great exertions it must make to carry on the circulation through the rapidly moving lungs.

I well remember being called a few years ago to attend a lady of this city, who was well known as a woman of much literary culture, and high mental capacity. I found her suffering from an over-distension—or thinning of the walls of the right side of the heart. She could not lie down because of the suffocating sensations which ensued. Nor could she walk across the house or up stairs without great distress. The heart beat very tremulously and feebly. She gave this his-

tory of her case. Only a year previous she was in good health. She was not then aware, from any sensation in the chest, that she possessed a heart. In an evil hour, however, late one evening, on returning home from a visit in a distant portion of the city, she ran violently to catch what she supposed was the last night-car. Her husband assisted her, and she reached it, but on entering the car she became blind and dizzy, and suffered from great oppression of the chest. On reaching home the oppression was attended by a sensation of great soreness, as if the heart had been bruised, and each beat was painful.

She was attended by one of our best physicians who treated her for several weeks for congestion of the lungs, for there was a short, dry cough, and constant oppression of the chest.

She never rallied from this overstrain, but constantly grew worse, until I found her in the condition described. I could not afford her more than temporary relief, for the heart was structurally diseased, and she died in a few months.

This is but a typical instance of the many cases now in existence in this city, Chicago, in which such over-exertion has resulted in permanent injury to the heart.



After the great fire of 1872, hundreds of cases came under medical care, for serious cardiac disease incurred on that dreadful night when men and delicate women had to run miles to save their lives.

If such exercise will so seriously affect the average healthy heart, what will it do to a heart *already* weakened by disease? The enfeebled heart may be utterly destroyed by such over-exertion. I once knew a lady who after running two blocks to intercept a car, suddenly dropped dead on entering it. An examination of the heart revealed that it had died in an open and relaxed condition. It had failed to contract from utter exhaustion, and its cavities were filled with coagulated blood.

Only a few days ago I was called to see one of our prominent business men who ran two blocks to catch the train. He no sooner entered than he fainted. His deathly pallor and coldness, alarmed every one who saw him, and well it might, for he had a narrow escape from sudden death. Had he been ten or twenty years older death would have resulted, for in advanced age the muscular coats of the arteries and the walls of the heart become weak, and often absolutely brittle

from calcareous deposits, and are ruptured or paralyzed from any over-strain.

The foolish custom of climbing long stairways, as in public buildings, or monuments, has seriously injured thousands of hearts. It is an exertion so unusual that the heart cannot withstand the intense strain.

Many tourists who have more ambition than judgment, have fallen victims to their mountain-climbing. Here the physical strain is aggravated by the rarified air in which they labor, which causes the heart, aside from the excitement of the exertion of the body to beat with greater rapidity and force.

The dangers attending the popular games of base-ball, foot-races, boat-racing, and other violent competitive exercises, can scarcely be over-rated. The applause of the world and of admiring friends would be turned to sorrow if they knew the future trouble which may be the lot of those who strain every muscle to win their applause.

If the votaries of these games were trained to them from their childhood, as were the Greeks for their Olympian games, the danger would be far less. The danger lies in the fact that but few

have been so trained. They come from avocations where such physical training has not been practiced. I allude particularly to the youth who attend colleges and universities. So soon as they begin their studies, they are enrolled in some club, and every leisure hour is devoted to violent exercise. In order to attain any degree of perfection in athletic strength, the functions of the brain must be neglected, or *should* be, for it is suicidal to tax the brain by severe study, and at the same time tax the body by severe physical exercise.

Those who have had opportunities of observing the effects of competitive athletic sports, especially in England, deplore their effects on the heart. They say that while the voluntary muscles are cultivated to such a high degree, the involuntary are enlarged and strengthened in a corresponding degree, thus the heart becomes larger, thicker and stronger, and enabled to do more work.

But there comes a time when this kind of a life must be abandoned, and the man return to ordinary business pursuits. Then, when the artificial muscular training has ceased, the voluntary muscles soon lapse down to an ordinary tone,

but the involuntary muscles, the heart especially, do not lapse in the same way, because it does not rest. It therefore remains in its acquired strength, all out of proportion to the rest of the muscular system.

The man, instead of being benefited by his physical training, is seriously injured, and his future capacity for physical exercise greatly hampered by the violent beating of an enlarged heart, of whose unpleasant action he is ever conscious.

It is time that all the foolish talk about the elevating and beneficial effects of spasmodic and acquired athletic sports should cease. The best medical men in other countries understand and proclaim the danger. Dr. Richardson says : " I venture to affirm there is not in England a trained professional athletic of the age of thirty-five, who has been ten years at his calling, who is not disabled."

There must be no disproportion of strength between the heart and the voluntary muscular system. If there is, the whole body suffers.

When a strong robust man has had a rheumatic affection of the heart, without general muscular rheumatism, the heart becomes the

weakest of all the muscles, and is therefore unable to supply the body with its proper amount of blood. Then the most remarkable results follow, and the victim usually dies of dropsy, or fatal lack of nutrition of some great and important organ.

Great ignorance prevails among the public in relation to the condition of the heart after acute diseases. They do not know that the heart is left as weak as the rest of the body. The fact is that during the progress of many prostrating diseases, and during convalescence from nearly all, the heart is very feeble. This is especially so in children and old people. Great care should therefore be taken by friends and nurses, that no undue emotional excitement should seize the patient, or that any sudden or active movement should be indulged in. Many people have lost their lives by an impatient, sudden motion, such as rising from the bed, walking across the floor, etc. The cause of death in such cases is found in a weakness of the heart, a weakness which results in fatal fainting from the shock of sudden labored action. While the body was lying the weak heart had no difficulty in throwing the blood all over the body, but when the erect posture was

suddenly assumed, the heart is inadequate to the task of propelling the weight of the blood *upward* to the head, and it is retained in its cavities, distending to the point of paralysis. In fact death occurs from paralysis of the heart.

The danger from this cause is greatest after acute rheumatic or other inflammations of the heart, or in patients who have been ill with some fever or inflammation of other organs, but who have already some organic disease of the heart.

The latter class should always be careful in their exercise. The organically diseased heart will pump the blood into all its various channels with sufficient force to carry on the functions of life, so long as its work is regular and uniform, but it may fail the moment it is taxed with any unusual labor.

#### THE HEARTS OF CHILDREN

Are peculiarly delicate and easily deranged. I imagine you asking the question: "Do children have heart-disease?" I answer yes, and very often. Quite a large percentage of children are born with some organic disease of the heart. These diseases arise from two causes, namely: (1) *Arrest of development*; (2) *Ante-natal inflammation*.

Some of you may have seen cases which belong to the first class. Among the most common is that disease known as "cyanosis," or the "blue disease," in which the child assumes, soon after birth a blue, or purplish color, and it soon dies—few live to mature years. I ought to say here that it is recommended that children born with such a disease should be placed on their *right* side, with the head and shoulders elevated as high as 45 degrees, or nearly half erect. This allows the heart to work more easily, and sometimes prevents the arterial blood from mixing with the venous. It is this mixing of the two kinds of blood which causes the blue color which gives the disease its name.

Cases have come under my care where this position of the child had to be constantly maintained for days and weeks, or until the heart became able to carry on its work, or the malformation had been remedied.

The children would breathe easily, sleep well, and have a good color so long as they were kept in the position I have described; but any change caused blueness, difficult breathing, etc.

There are certain diseases of children which may result fatally unless great care is taken that

the heart is not overtaxed. Among these diseases, rheumatism, diphtheria, scarlet fever and pneumonia are most prominent. *Rheumatism* usually leaves such injury done to the valves that any violent motion excites the heart so much that the incompetent valves do not allow the blood to flow properly through the heart. *Diphtheria* is more dangerous to the heart than any other malady. You have all of you heard of cases where the child passed through an attack of this disease, and was supposed to be out of all danger. It would be allowed to sit up or walk about the room, when, to the astonishment of all, it has fallen down suddenly *dead*. Such cases are common. The child dies from paralysis of the heart, which has been poisoned by the virus of this fearful disease, just as the heart is poisoned by the venom of a serpent.

After an attack of diphtheria or pneumonia children should be watched carefully, lest they make some sudden motion. They should be kept quiet, and, if not too young, cautioned of the serious consequences.

HOW CAN PHYSICIANS KNOW WHEN THE HEART  
IS DISEASED.

(x) We divide heart-disease into two classes.



The functional, or nervous; when the nerves of the heart are deranged, causing various pains and unnatural motions.

(2) The organic, *i. e.*, when the normal, healthy *structure* of the heart has been changed by disease.

We ascertain the presence of the former by an investigation into the *general* condition of the patient. We inquire if the blood is rich enough; whether other organs are affected; whether the spinal cord is diseased, or if the mind is disordered, for all these may cause derangement of the heart's functions. Some of the most troublesome cases of heart-trouble are caused by other organs, and the heart is only irritated by reflex irritation.

We examine the character and rate of the pulse, if it is too fast or too slow, irregular or intermitting, too small or too large, too soft or too hard, and many other qualities which it would weary you to enumerate. Then we listen to the action of the heart by applying the ear over the chest, or by the aid of a *stethoscope*, and if its *sounds* are those of a natural heart, while its *motions* are disordered, we call it a case of *functional* disease.

In this form of disease there is little danger to life or the maintenance of moderate health. People are generally more anxious and alarmed about a *nervous* disorder of the heart than if it was organic. Its constant or paroxysmal disordered action worries and annoys them, and they cannot help thinking of the heart. The more one fixes the mind upon the heart, fearing it is diseased, the more badly it acts.

There is a marked correspondence between functional disorder of the heart and the same condition of the lungs. In both the sufferer is anxious and loses hope.

If, on the contrary, the heart or lungs are structurally diseased, the patient is calm and hopeful, and never seems to appreciate his real condition. By bearing these facts in mind, you, as well as physicians, can predict quite certainly as to the nature of the disorder and its real danger.

The physician ascertains the presence of *organic* disease, by listening to the sounds and motions of the heart. There are certain sounds made by the heart when beating, which, if present in their natural sequence and tone, denote a healthy organ.

If these sounds do not recur in their regular

order, or are absent, or are replaced by other sounds not made by a healthy heart, we know that its shape, size or action is materially changed, or that one or many more of its intricate valves are out of order, or are changed in shape and size.

The cultivated ear is often enabled to locate exactly the very point of disease, to tell which of its valves are disordered, or what delicate cord in its mechanism is injured by disease.

In conclusion, let me assure you that the study of the anatomy, physiology, pathology, hygiene and curative agencies connected with the heart is the work of a lifetime.

The most capable mind may well hesitate before undertaking the task of mastering the life-history of the healthy and diseased heart.

If, therefore, I have failed to give you a clear idea of the subject which I have attempted to present you, it has been because I have had a great and intricate subject to deal with, and not because I have not tried to explain and instruct.

[THE END.]



# INDEX.



Anger, rage, effects of.....	30
Anæmia, effects of.....	37
Aneurist .....	45
Alcohol, bad effects of.....	57
Athletic sports, bad effects of.....	43
Blood, impoverished.....	38
Broken Heart.....	75
Circulation of Heart.....	14
Coffee, bad effects of.....	46
Chicago fire, effects of.....	38
Children, hearts of.....	84
Cyanosis, or "blue disease".....	85
Carbonic oxide gas, effects of.....	67
Diet, influence of on Heart .....	40
Description of the Heart.....	10

---

Does the Heart ever rest?.....	15
Dilatation of Heart.....	34
Diphtheria. effects of.....	86
Emotions, influence of.....	24
Enlargement of Heart.....	43
Exercise, good and bad effects of.....	69
Exertion, violent and sudden....	75
Fainting.....	26
Fear, effects of.....	26
Fatty food, effects of.....	45
Fatty Heart .....	58, 46
Fainting, how to treat it.....	62
Grief, effects of.....	34
Healthy Heart.....	17
How can we take care of the Heart.....	21
Heart disease, statistics of.....	35
Homesickness, effects of.....	36
Heart strain.....	43
Heart failure, causes of.....	73
Heart, condition of, after acute diseases.....	86

---

Hearts of children.....	84
Heart disease, how diagnosed.....	86
Heart, state of after diphtheria.....	86
How physicians diagnose heart disease.....	86
Heart disease, varieties of.....	86
Imagination, influence, &c.....	22
Impure air, effects of.....	61
Joy, effects of.....	32
Location of the Heart.....	18
Muscles of the Heart .....	12
Nerves of the Heart.....	12
Neuralgia of the Heart.....	55
Nervous diseases of Heart.....	88
Organic diseases of Heart.....	88
Pulse, rate of at different ages.....	18
Power of the Heart.....	16
Pains in the Heart.....	19
Paralysis of Heart.....	26

Reflex irritation of the Heart.....	21
Rupture of the Heart....	75
Running to Catch the Cars.....	77
Rheumatism, effects of.....	86
Statistics of Death from Heart Disease.....	35
Straining of the Heart.....	43
Tea, bad effects of.....	49
Tea, black, how to make it.....	52
Tobacco, bad effects of.....	53
Ventilation, importance of.....	68
Will, influence of.....	23









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